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from the author

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March 17, 1853.

1. "On Animal and Vegetable Fibre as originally composed of Twin Spiral Filaments, in which every other structure has its Origin; a Note showing the confirmation by Agardh, in 1852, of observations recorded in the Philosophical Transactions for 1842." By Martin Barry, M.D., F.R.S., F.R.S.E.

After referring to the drawings to his paper on Fibre, published in the Philosophical Transactions for 1842, and the opinions entertained by physiologists regarding the peculiar views he advanced in that paper with reference to the original composition of organic fibre, the author states that, after the lapse of eleven years, these views have been fully confirmed, and in proof of this refers to a paper—"De cellula vegetabili fibrillis tenuissimis contexta" (Lundæ, 1852), by Agardh. He further remarks, that his paper of 1842 contains a record of other observations made in a field beyond the region of Agardh's researches; observations which he thinks explain how it is that fibre forms the membrane of the cell, and, what he deems of more importance still, the mode of origin of fibre. He refers generally to the drawings in that paper, from which, in connection with facts previously recorded in the Philosophical Transactions, he states that it appears—1, that fibre has its origin in the so-called "cytoblast," the outer part of which always passes into a ring or coil of fibre; 2, that when a cell is to arise, its primary membrane is formed out of this ring or coil of fibre; 3, that then the nucleolus of the "cytoblast" becomes the nucleus of the cell; 4, that the outer part of the nucleus of the cell also passes into a ring or coil of fibre, wherewith to form deposits such as the annular and spiral, or to weave the secondary membranes; 5, that the term "cytoblast" is unsuitable, as the body so called does not always become a cell; 6, that fibre is thus more universal as well as more primitive even than the cell, for fibre not only forms the cell, but it forms other structures without having first to form a cell; 7, that the prime mover in both the "cytoblast" and the nucleus is the *nucleolus*,

which is the organ of absorption, assimilation, and secretion; 8, that the nucleolus is continually giving off its substance and continually renewing it, continually passing from the state of nucleolus into that of "cytoblast" or nucleus,—so that the "cytoblast" and the nucleus are each of them but the nucleolus enlarged; 9, that it is therefore the nucleolus enlarged that passes into fibre; 10, that the nucleolus always passes into fibre, and directly into no other form than that of fibre; 11, that thus the whole organism arises out of nucleoli, for fibre is but the nucleolus in another shape, and every structure arises out of fibre; 12, that the nucleolus is reproduced by self-division, and that subsequently, when it has passed into the form of fibre, the mode in which the nucleolus gives origin to other structures is such as to imply even here the continued reproduction of its own substance—that mode being self-division.

The author describes particularly the mode of origin of primary and secondary membranes, and division of the cell. He considers that the latter is initiated by self-division of the nucleolus into halves which become "cytoblasts," and it is completed by the formation out of these of two young cells, the walls of which, where in contact with one another, form a septum dividing the parent cell into two compartments. Thus for division of the cell there occurs no folding inwards of a "primordial utricle," as maintained by Von Mohl, nor any division of the contents of a parent cell into two parts, around which contents are formed the walls of two young cells, as supposed by Nägeli and Hofmeister. On the subject of annular, spiral, and other deposits in the vessels of plants, the author remarks, that when the divisions of an annular or spiral fibre are not continued, but partial and irregular, we have the reticular form, as well as an explanation of the supposed tendency in vegetable fibre to anastomosis.

The two spiral filaments composing fibre at first appeared to the author to run in opposite directions, which he subsequently saw was not the case,—their direction is the same. This error he corrected in Müller's Archiv for 1850.

The author remarks, that observers in their endeavours to reach the *ultimate* structure of the muscular fibril have actually gone too far, and reached a later generation,—mistaking for the fibril a row of quadrilateral particles, the mere elements thereof. These particles, he observes, are known to be alternately light and dark in alternate order; they give origin to the twin spirals; and for this purpose the dark particles undergo what observers have entirely overlooked, division and subdivision, which changes he figured in Müller's Archiv, 1850. The preparation in which he has again met with the subdivision into four is still, the author states, in his possession for demonstration to others.

2. "On the penetration of Spermatozoa into the interior of the Ovum; a Note showing this to have been recorded as an established fact in the Philosophical Transactions for 1843." By Martin Barry, M.D., F.R.S., F.R.S.E.

Referring to a statement by Dr. Nelson, in a paper "On the re-

production of the *Ascaris Mystax*," that the investigations in that paper "appear to be the first in which the fact of the penetration of spermatozoa into the ovum has been distinctly seen and clearly established in one of the most highly organized of the Entozoa," the author of the present communication remarks, that when Dr. Nelson made this statement he was evidently not aware of what had been published on the subject. In proof of this Dr. Barry refers to his own paper, entitled "Spermatozoa observed within the Mammiferous Ovum" (Phil. Trans. 1843, p. 33), in which he states that he had met with ova of the Rabbit containing a number of spermatozoa *in their interior*; and to the Edinburgh New Philosophical Journal for October 1843, which contains a drawing in which seven spermatozoa are represented in the interior of an ovum, besides the statement that in one instance he had counted more than twenty spermatozoa in a single ovum. In conclusion he remarks, that Dr. Nelson merely added a further confirmation in ova of an entozoon, to what his own researches on mammiferous ova had enabled him to record as an established fact nine years before.

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3. "Researches in Embryology; a Note supplementary to Papers published in the Philosophical Transactions for 1838, 1839 and 1840, showing the confirmation of the principal facts there recorded, and pointing out a correspondence between certain structures connected with the Mammiferous Ovum and other Ova." By Martin Barry, M.D., F.R.S., F.R.S.E.

Referring to his account of the process of fecundation of the mammalian ovum and the immediately succeeding phenomena, published in various papers in the Philosophical Transactions, the author calls attention to the confirmation which his views have received from corresponding observations made by subsequent inquirers on the ova of other animals. He more particularly adverts to a recently published memoir by Dr. Keber, in which that physiologist describes the penetration of the spermatozoon into the interior of the ovum, in *Unio* and *Anodonta*, through an aperture formed by dehiscence of its coats, analogous to the micropyle in plants.

Small pellucid vesicles, lined with ciliated epithelium and enclosing a revolving mulberry-like object, such as the author discovered imbedded under the mucous membrane of the rabbit's uterus and described in the Philosophical Transactions for 1839, have been likewise observed by Keber, not only under the mucous membrane, but also and most frequently in some part of the cavity of the abdomen. Keber considers these bodies to be fecundated ova. The author agrees with Keber in considering them to be ova, but he does not suppose them to be fecundated, nor does he think that their membrane is the vitellary membrane ("zona pellucida"), which he believes to have been absorbed. He considers such ova to have been detached from the ovary along with their containing ovisac, which in their new situation constitutes the ciliated capsule, and as they present themselves in unimpregnated animals, he now believes that

the formation of a mulberry-like group of cells from the germinal spot and the process of division and subdivision of the latter take place without fecundation; but when this happens, the mulberry is not found to contain one cell larger than the rest, the nucleus of which, according to his observations, is the embryo. He is further of opinion, that in all cases of separation of ova, the ovisac or internal coat of the Graafian follicle is detached from the ovary, either entire and along with the ovum, as in the instances alluded to, or after the ovum has first escaped by rupture, as in the instance of the fecundated ovum.

The author is led to the following conclusions with reference to the structures connected with the ovum in different animals:—1. That in the mammalia the vesicle he described as the foundation of the Graafian follicle, and termed the ovisac, *does not remain permanently in the ovary*, but is *expelled and absorbed*. 2. That in the Bird, the ovum, when escaping from the ovary, is accompanied by the corresponding vesicle—the ovisac; and that *the ovisac becomes the shell-membrane of the Bird's egg*. 3. That the expelled and lost ovisac in the mammalia therefore corresponds to the shell-membrane in the Bird. 4. That after the formation of the ovum the albuminous contents of the ovisac in the mammalia correspond to the albumen in the Bird's egg. 5. That the author's retinacula in the mammalia, after all, find their analogue in the chalazæ of the Bird; and that both have their origin in the granular contents of the ovisac, which at an early period are in appearance just the same in both. 6. That the shell-membrane of the Bird is thus a primary cell.

He then points out the position which from his observations is to be assigned to the several parts of the ovum in the language of "cells;" and shows the presence of a plurality of ova in a Graafian follicle to be referable to the same cause as that producing more than one yelk (ovum) in the Bird's egg.